CLAIMS:

1) A composition for use to discriminate between latent and active TB comprising at least a peptide sequence selected from the group of SEQ. ID No 2, No 4, No 6 and No 8 and corresponding mixtures.

2) A composition according to claim 1 further comprising at least a peptide sequence selected in the group of SEQ. ID No 10 and No 12 and corresponding mixtures.

3) A peptide sequence selected from the group consisting of: SEQ. ID No. 2, 4, 6, 8.

4) An *in vitro* method for diagnosing, discriminating between latent and active TB and monitoring the different states of tuberculosis, whereby an aliquot of whole venous blood or PBMC (peripheral blood mononuclear cells) is admixed with an effective amount of the composition according to claim 1.

5) An *in vitro* method for diagnosing, discriminating between latent and active TB and monitoring the different states of tuberculosis according to claim 4 , whereby an aliquot of whole venous blood or PBMC (peripheral blood mononuclear cells) is admixed with an effective amount of the composition according to claim 2.

6) An *in vitro* method for diagnosing, discriminating between latent and active TB and monitoring the different states of tuberculosis, comprising the following steps:

a) admixing an aliquot of venous blood or mononuclear cells (PBMC) isolated from venous blood with a mixture comprising each of the following reagents:

- Reagent 2, at least one intact protein selected in the group of ESAT-6 and CFP-10, and corresponding mixtures;

- Reagent 3: at least one ESAT-6 peptide selected in the group of SEQ ID NO 10, 12, and corresponding mixtures, diluted in a solvent
- Reagent 4: at least one CFP-10 peptide selected in the group of SEQ ID NO 2, 4, 6, 8, and corresponding mixtures, diluted in a solvent;
- Reagent 5: a mixture of at least one ESAT-6 and CFP-10 peptides, selected in the groups of SEQ ID NO 10, 12 and SEQ ID NO 2, 4, 6, 8, and mixtures thereof, diluted in a solvent;

b) measuring T-lymphocytes response.

7) A method according to claim 6 wherein the mixture in step a) further comprises:

- Reagent 6: an aspecific T-Lymphocyte stimulus, as phythoemoagglutinine (PHA), positive control
- Reagent 7: PPD, Purified Protein Derivative.

8) A method according to claims 6-7 wherein the mixture in step a) further comprises:

- Reagent 1: CTR, complete culture medium or medium comprising the solvent concentration present in Reagents 3-5 (negative control).

9) A method according to claim 8 wherein the solvent is dimethyl sulfoxide (DMSO).

10) A method according to claims 6-9, whereby T-lymphocytes response is measured by: ELISPOT, FACS, whole blood ELISA.

11) A method according to claim 10 wherein said cytokine is selected from the group consisting of: IFN-gamma, TNF-alpha, GMSF, interleukins IL1-IL24.

12) A method according to claims 6-11 wherein the response is mediated by CD4 T lymphocytes .

13) A method according to claims 6-12 wherein, in case whole venous blood is used, said blood is placed into heparinised test tubes, and T-lymphocyte response is assessed by ELISA on plasma.

14) A method according to claims 6-12 wherein, in case PBMC are used, T-lymphocyte response is assessed by ELISPOT or Flow Cytometric Analysis.

15) A method according to claims 6-12 wherein PBMC are obtained from whole blood by density gradient centrifugation using a method based on the use of filter-equipped tubes for separation of leukocytes.

16) A method according to claims 6-12 wherein the incubation is carried out on PBMC from whole blood for at least 40 hours with subsequent quantitative determination of IFN-gamma production by Antigen-Specific T lymphocytes by the ELISPOT method.

17) A method according to claims 6-12 wherein the incubation of PBMC from whole blood is carried out for at least 16 hours with subsequent determination of IFN-gamma production by Antigen-Specific T lymphocytes, said determination being both qualitative in terms of presence/absence of Antigen-Specific T lymphocytes, by FACS, and quantitative in terms of percentage and frequency of specific cells per mm^3 of blood.

18) A method according to claims 6-12 wherein the incubation is performed on whole blood for approximately 24 hours with subsequent quantitative determination of IFN-gamma production by Antigen-Specific T lymphocytes by ELISA.

19) A method to elaborate results from output values from method according to claim 6-18, comprising the following steps:

- Calculate the absolute values, from subtracting the output value of the negative control, sample admixed

with Reagent 1, from the output values for the reagents R2-R7

- Compare said absolute values with the correspondent cut-off values, and if:
    - below said value, the output is not valid.
    - above said value, determine if it fulfils the following criteria: value for Reagents 2, 6, 7 is at least 3-fold higher than value for Reagent 1; value for Reagent 3 is at least 2-fold higher than value for Reagent 1; value for Reagents 4 and 5 is at least 4-fold higher than value for Reagent 1;
- Ascertain if the response for Reagent 6 is positive: if not, the patient is diagnosed anergic, and the assay is not further evaluable; if the response for Reagent 6 is positive :
- Ascertain if the response for Reagent 7 is positive: if not, the patient is diagnosed as a healthy subject, if so
- Ascertain if the response for Reagent 2 is positive: if not, the patient is diagnosed as BCG-vaccinated or exposed to atypical *Mycobacteria*, if so
- Ascertain if the response to Reagent 3 or 4 or 5 or a mixture of these is also positive: if not, the patient is diagnosed as a latent TB patient or a TB patient under efficacious anti-TB therapy; if the response to Reagent 3 or 4 or 5 or a mixture of these is positive, the patient is diagnosed as an active TB disease patient or a patient recently re-infected with *M. tuberculosis*

20) A method according to claim 19, where the cut-off minimum is 34 SFCs reading for Reagent 3, 4 and 5 ELISPOT output, 36

SFCs reading for Reagent 2 ELISPOT output, 60 SFCs reading for Reagent 6, 7.

21) A method to elaborate a diagnosis according to claim 19, where the cut-off minimum is 0.6 IU/mL for Reagents 2-7.

22) A system to elaborate results from output values from method according to claim 6-18 characterised in that it comprises means for performing the steps of the method of any of the claims from 19 to 21.

23) A computer program comprising computer program code means adapted to perform all the steps of claim 19-21 when said program is run on a computer.

24) A computer readable medium having a program recorded thereon, said computer readable medium comprising computer program code means adapted to perform all the steps of claim 19-21 when said program is run on a computer

25) A diagnostic kit for diagnosing and monitoring states of tuberculosis infection, comprising:

- Reagent 1: CTR, complete culture medium or medium comprising the solvent concentration present in Reagents 3-5;
- Reagent 2, at least one intact protein selected in the group of ESAT-6 and CFP-10, and corresponding mixtures;
- Reagent 3: at least one ESAT-6 peptide selected in the group of SEQ ID NO 10, 12, and corresponding mixtures, diluted in a solvent ;
- Reagent 4: the composition according to claim 1 diluted in a solvent;
- Reagent 5: the composition according to claim 2 diluted in a solvent;

- Laboratory materials and instructions for test procedure.

26) A kit according to claim 25 that further comprises:

- Reagent 6: an aspecific T-Lymphocyte stimulus, as PHA, phythoemoagglutinine;
- Reagent 7: PPD, Purified Protein Derivative.

27) Use of a peptide selected in the group of SEQ ID NO 2, 4, 6 and 8 and corresponding mixtures in producing a diagnostic kit for determination of the different states of TB present in a patient.

28) Use of a peptide sequences selected in the group of SEQ. ID No.2, 4, 6, 8 and corresponding mixtures in combination with a peptide selected in the group of SEQ ID NO 10, 12 and corresponding mixtures in producing a diagnostic kit for discrimination between latent and active TB present in a patient.

29) Use of a kit according to claims 27-28, wherein the subject to be tested is an individual selected among mammals, such as a primate, cow, sheep, pig, badger or rodent, e.g. a mouse or rat, humans being included.

30) Use of a kit according to claims 27-28 wherein the subjects to be tested are subjects at risk of tuberculosis.

31) Use of a kit according to claims 27-28 wherein the subjects to be tested are children, health care workers and immuno-compromised patients.

32) Nucleotide sequence encoding the peptides according to claim 3.

33) Nucleotide sequence: SEQ ID NO 1.

34) Nucleotide sequence: SEQ ID NO 3.

35) Nucleotide sequence: SEQ ID NO 5.

36) Nucleotide sequence: SEQ ID NO 7.